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VARIATION IN *EVOLVULUS NUTTALLIANUS* (CONVOLVULACEAE) IN CENTRAL TEXAS

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ABSTRACT

The normally pubescent *Evolvulus nuttallianus* Schult. occurs with a purely glabrous form in northern Hays County, Texas. The origin of the glabrous form may be, in part, the result of its location at the eastern edge of this taxon. Both the glabrous and pubescent forms in northern Hays Co. share atypical ovate-lanceolate sepals, another feature known from the eastern edge of its range. A revised key for *Evolvulus* species in Texas is presented.

Strong pubescence has been noted as a key characteristic within the genus *Evolvulus* in Texas treatments, but especially for *E. nuttallianus* Schult. (syn. *E. pilosus* Nutt.). Common name epithets for this species include shaggy, silky, hairy, silver, and woolly. *Evolvulus nuttallianus* reaches the southeasternmost edge of its distribution in northern Hays County, Texas, near the eastern edge of the Edwards Plateau and west of the Balcones Escarpment (Map 1). *Evolvulus nuttallianus* is relatively rare in this area — the species is represented in TEX/LL herbaria by very few vouchers in this area: 5 in Travis County (most recent in 1950), 2 in Hays County (mine, 2003), 1 in Blanco County (1987), 1 in Bexar County (no date, no location). Recent sightings by Terri Siegenthaler and the author from western Travis County have been from the Shield Ranch and the Hamilton Pool Nature Preserve.

A population of ±20 small plants, at least half of them lacking hairs, is found in northern Hays County on the private Purola Preserve and an adjacent ranch, on a high barren ridgetop in a sunny calcareous sandy opening in oak-juniper association. All parts (i.e., leaves, stems, sepals) of the glabrous plants lack hairs, and although small (less than 5–12 cm tall), even from a distance of several yards their glossy appearance is eye-catching (Figs. 1–5). These grow in close association with the pubescent plants (Fig. 2), but no intermediate forms occur. First noted in the 1990s, the glabrous population has persisted, surviving the exceptional droughts of 2006 and 2008.

The hairs of the pubescent plants are essentially the same as those found on *Evolvulus nuttallianus* elsewhere in Texas, certainly not smaller, although less dense (Figs. 6-8, Map 2).

Associated taxa at the Purola Preserve include *Evolvulus sericeus*, *Polygala lindheimeri*, *Chamaesyce fendleri*, *Hedeoma reverchonii* var. *reverchonii*, *Stenaria nigricans* var. *nigricans*, and *Schizachyrium scoparium*. No other populations of *E. nuttallianus* are known from the immediate vicinity. Voucher specimens of individuals from this site are deposited at TEX (*Harms 43-A*, glabrous, Figs. 9–10; *Harms 43*, pubescent, Fig. 11).

One atypical feature of both *Evolvulus nuttallianus* forms in northern Hays Co. is their ovate-lanceolate outer sepals (Fig. 4). This is also noted from other collections from the eastern edge of its range (Map 1). This contrasts with the typical lanceolate to narrowly lanceolate sepals found elsewhere, although similar to the ovate sepals of closely related *E. arenarius* on the Texas/New Mexico border (Harms 2014).

Although the origin of this glabrous form is not known, several factors seem relevant. First, *Evolvulus nuttallianus* is at the eastern edge of its range and relatively rare in this area. No other populations are known from the immediate vicinity. Second, a west-to-east clinal reduction of hair density occurs in *E. nuttallianus*, with the eastern populations (like this one) being the most sparsely pubescent (Map 2). Third, *E. sericeus*, with glabrous upper leaf surface and ovate sepals, occurs in the immediate vicinity of the glabrous population, and so the possibility of hybridization must be considered. Whether the glabrous form originated from a random single-gene mutation, hybridization, or chance allelic combinations, low population density and apparently relaxed selection for pubescence density probably are factors in its origin, persistence, or both.

Revised *Evolvulus* key for Texas

Current Texas keys rely heavily on pubescence, especially to distinguish *Evolvulus nuttallianus* and *E. sericeus*; e.g., Shinners (1970); Diggs et al. (1999). Sepal form, following van Ooststroom (1934), is also used; e.g., Diggs et al. (1999); Austin (1998). In so far as possible I have avoided these differentiae, especially distinctions of hair habit and density.

1. Leaves with palmatipinnate venation (generally visible on some leaves without clearing); upper leaf surface glabrous with lower leaf surface pubescent, or both surfaces pubescent; phyllotaxis distichous ..... **Evolvulus sericeus**
1. Leaves with pinnate venation; both leaf surfaces pubescent or both glabrous; phyllotaxis distichous or pentastichous.

    2. Phyllotaxis distichous; inflorescence with peduncles >6 mm and few-flowered cymes ..... **Evolvulus alsinoides**
    2. Phyllotaxis pentastichous 2/5; inflorescence with peduncles <6 mm (rarely >0.5 mm) and solitary flowers.

        3. Foliage sparse with internodes commonly >4 mm; mid leaves linear, length/width ratio >8:1; trichomes asymmetrical with short forks <0.25 mm long ..... **Evolvulus arenarius**
        3. Foliage dense with internodes rarely >4 mm; mid leaves elliptical, length/width ratio <8:1; trichomes asymmetrical with short forks >0.25 mm long ..... **Evolvulus nuttallianus**

ACKNOWLEDGEMENTS

I am indebted to Tom Wendt for his assistance and many insightful suggestions in preparing this paper, to Prof. Jim Mauseth for allowing me to use his lab and for his patient guidance in the leaf clearing process, and to Terri Siegenthaler for helping me search for *Evolvulus* on the Shield Ranch. I am grateful to herbarium SRSC for the loan of its *Evolvulus* collections.

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van Ooststroom, S.J. 1934. A monograph of the genus *Evolvulus*. Med. Bot. Mus. en Herb. Rijksuniv. 14, Utrecht.

Figure 1. *Evolvulus nuttallianus* glabrous with emerging small plants. 4 Jun 2014

Figure 2. Pubescent form on left; glabrous form on right. 2 May 2010.

Figure 3. Glabrous form detail (via dissecting microscope). 4 Jun 2014.

Figure 4. Ovate-lanceolate outer sepals; glabrous form on left.

Figure 5. Glabrous form leaf scans (top); venation with cleared leaf (bottom).

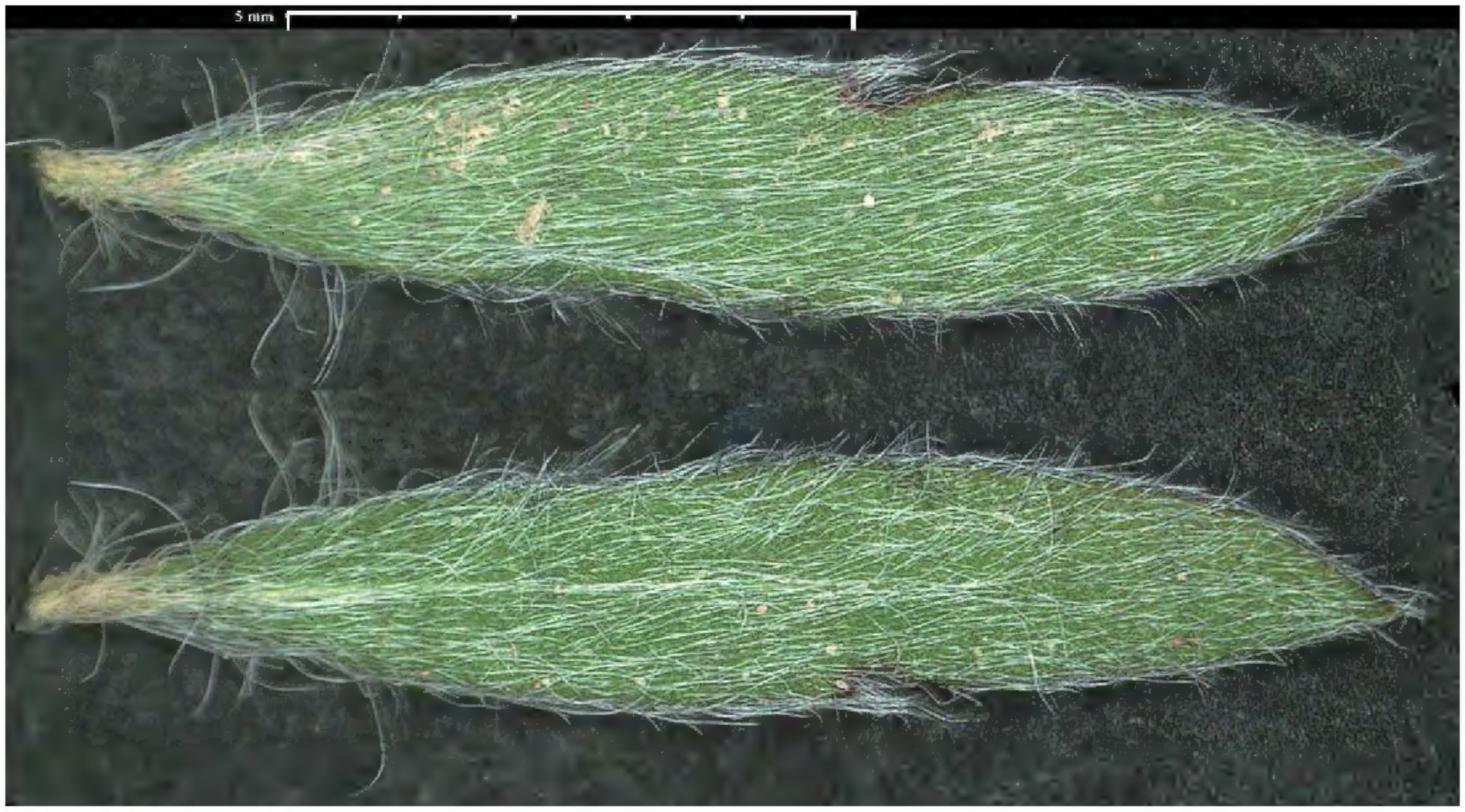

Figure 6. Pubescent form leaf scans.

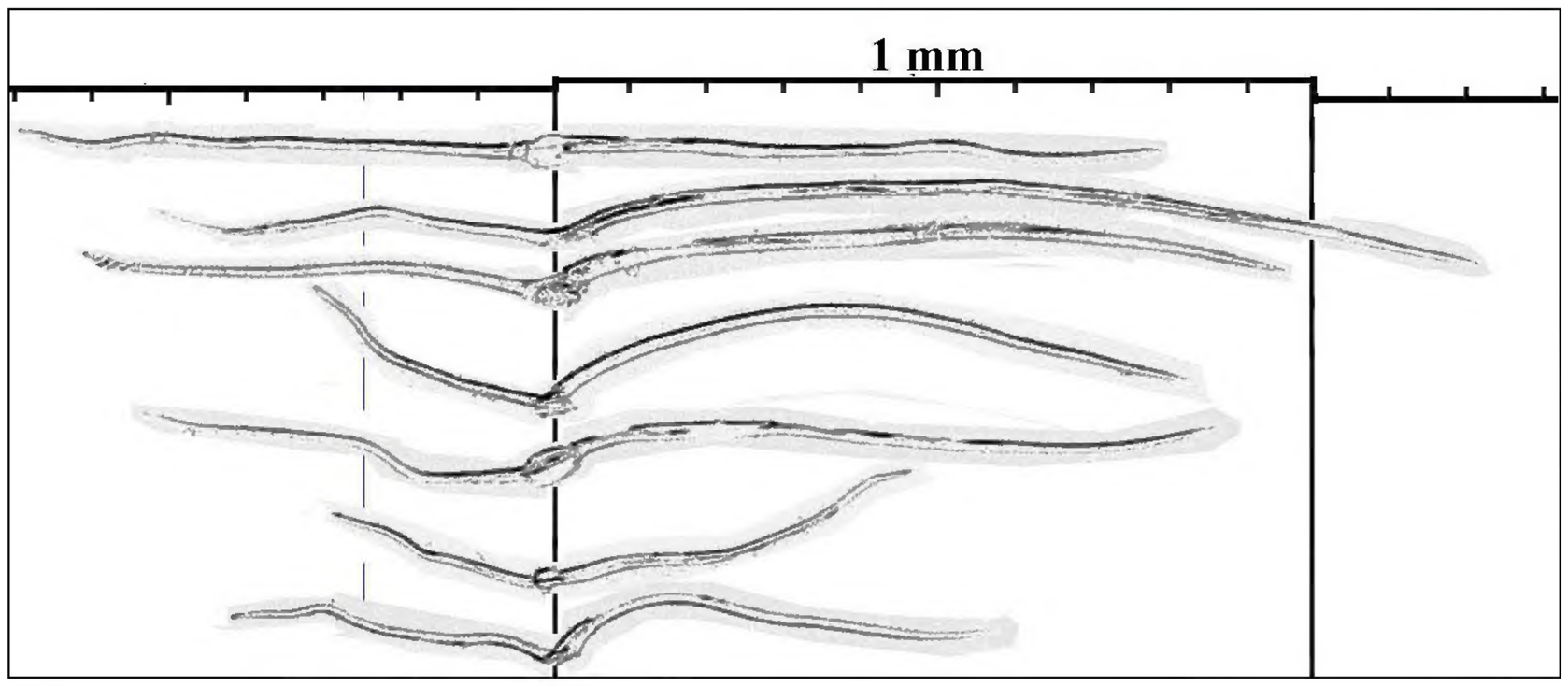

Figure 7. Typical hairs of pubescent form.

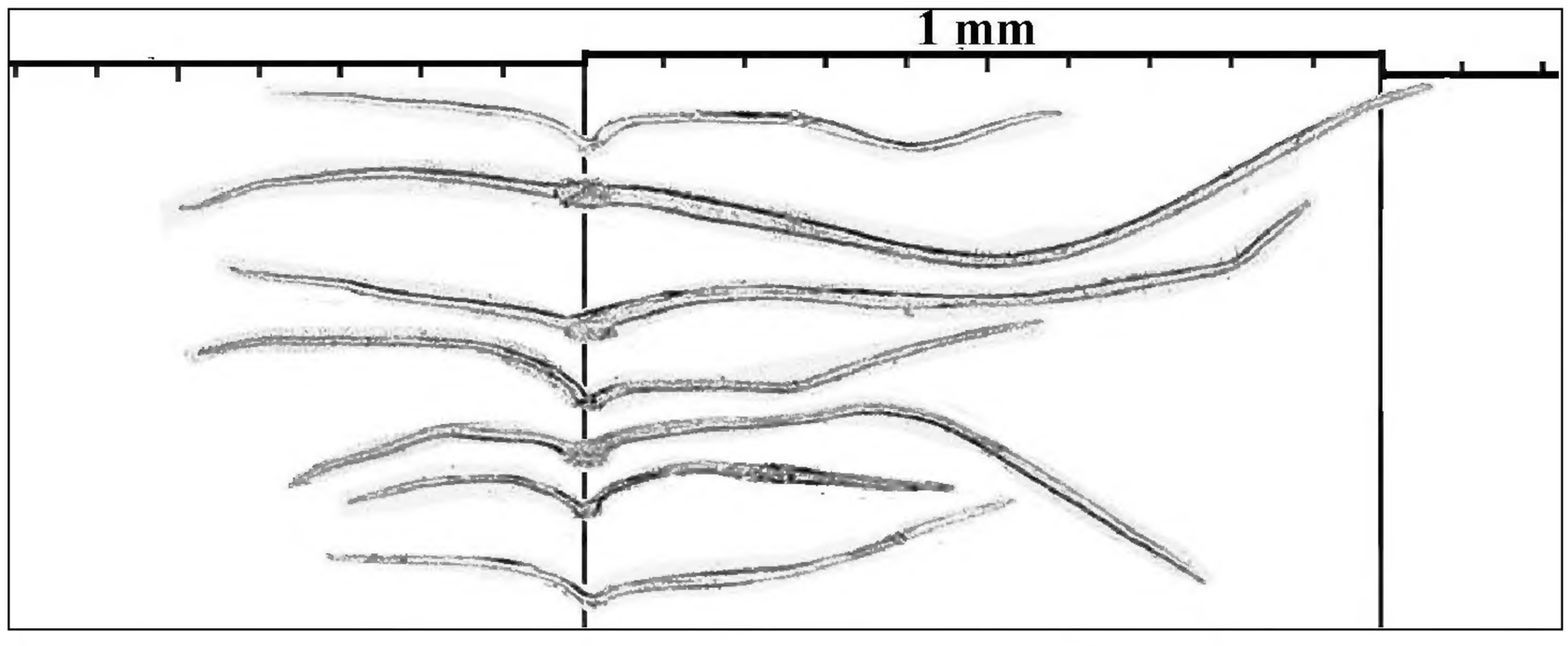

Figure 8. Typical hairs of *Evolvulus nuttallianus*, Culberson County (Trans-Pecos).

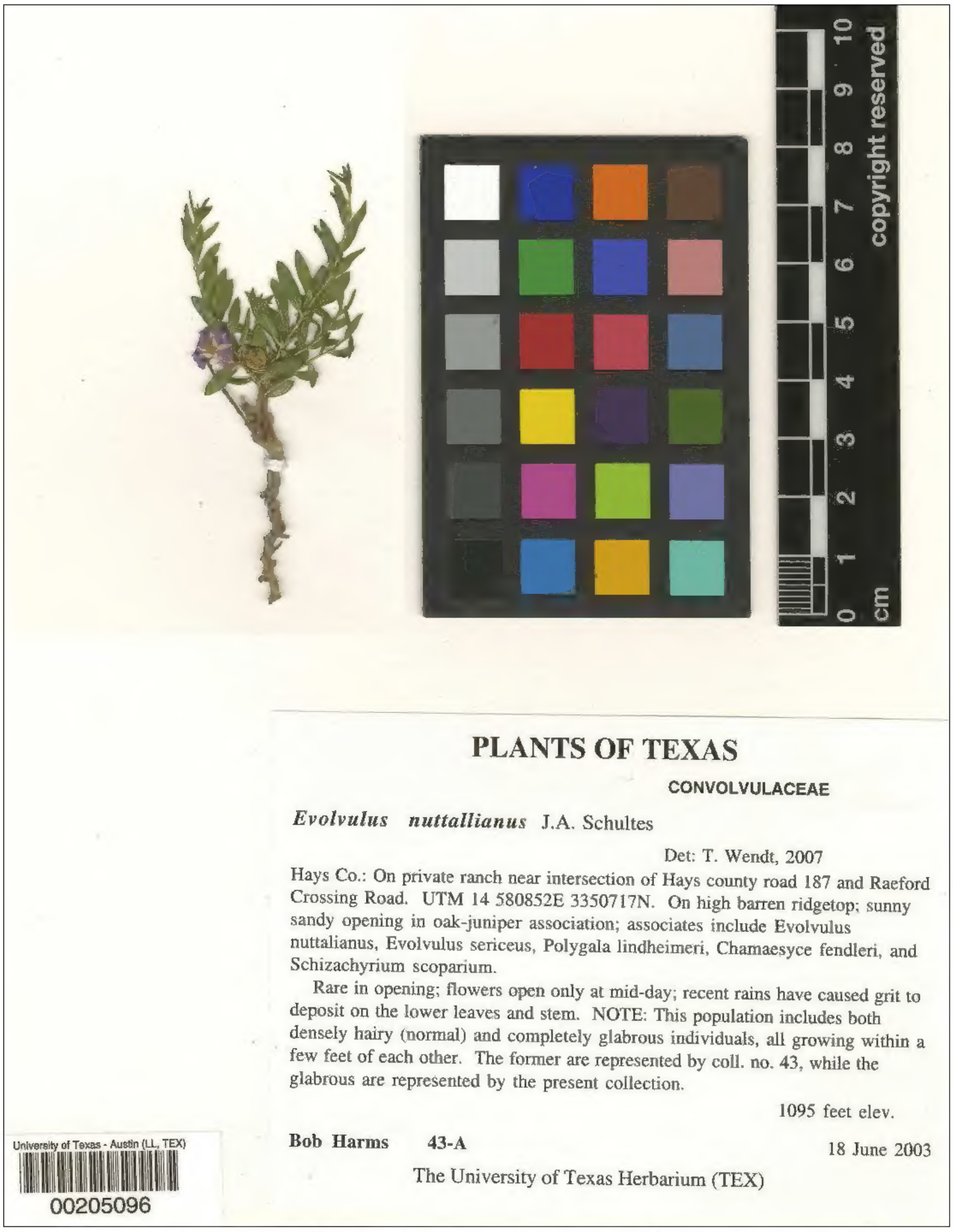
copyright reserved
0 1 2 3 4 5 6 7 8 9 10
cm
PLANTS OF TEXAS
CONVOLVULACEAE
Evolvulus nuttallianus J.A. Schultes
Det: T. Wendt, 2007
Hays Co.: On private ranch near intersection of Hays county road 187 and Raeford Crossing Road. UTM 14 580852E 3350717N. On high barren ridgetop; sunny sandy opening in oak-juniper association; associates include Evolvulus nuttalianus, Evolvulus sericeus, Polygala lindheimeri, Chamaesyce fendleri, and Schizachyrium scoparium.
Rare in opening; flowers open only at mid-day; recent rains have caused grit to deposit on the lower leaves and stem. NOTE: This population includes both densely hairy (normal) and completely glabrous individuals, all growing within a few feet of each other. The former are represented by coll. no. 43, while the glabrous are represented by the present collection.
1095 feet elev.
Bob Harms 43-A
18 June 2003
The University of Texas Herbarium (TEX)
University of Texas - Austin (LL, TEX)
00205096

Figure 9. Glabrous *Evolvulus nuttallianus*, *Harms 43-A* [TEX], 18 Jun 2003 (cropped for figure display).

Figure 10. Glabrous *Evolvulus nuttallianus*, *Harms 43-A* [TEX], 18 Jun 2003 (scanned at 1200 dpi).

PLANTS OF TEXAS

CONVOLVULACEAE

Evolvulus nuttallianus J.A. Schultes

Det: T. Wendt, 2007

Hays Co.: On private ranch near intersection of Hays county road 187 and Raeford Crossing Road. .UTM 14 580852E 3350717N. On high barren ridgetop; sunny sandy opening in oak-juniper association; associates include Evolvulus nuttalianus, Evolvulus sericeus, Polygala lindheimeri, Chamaesyce fendleri, and Schizachyrium scoparium.

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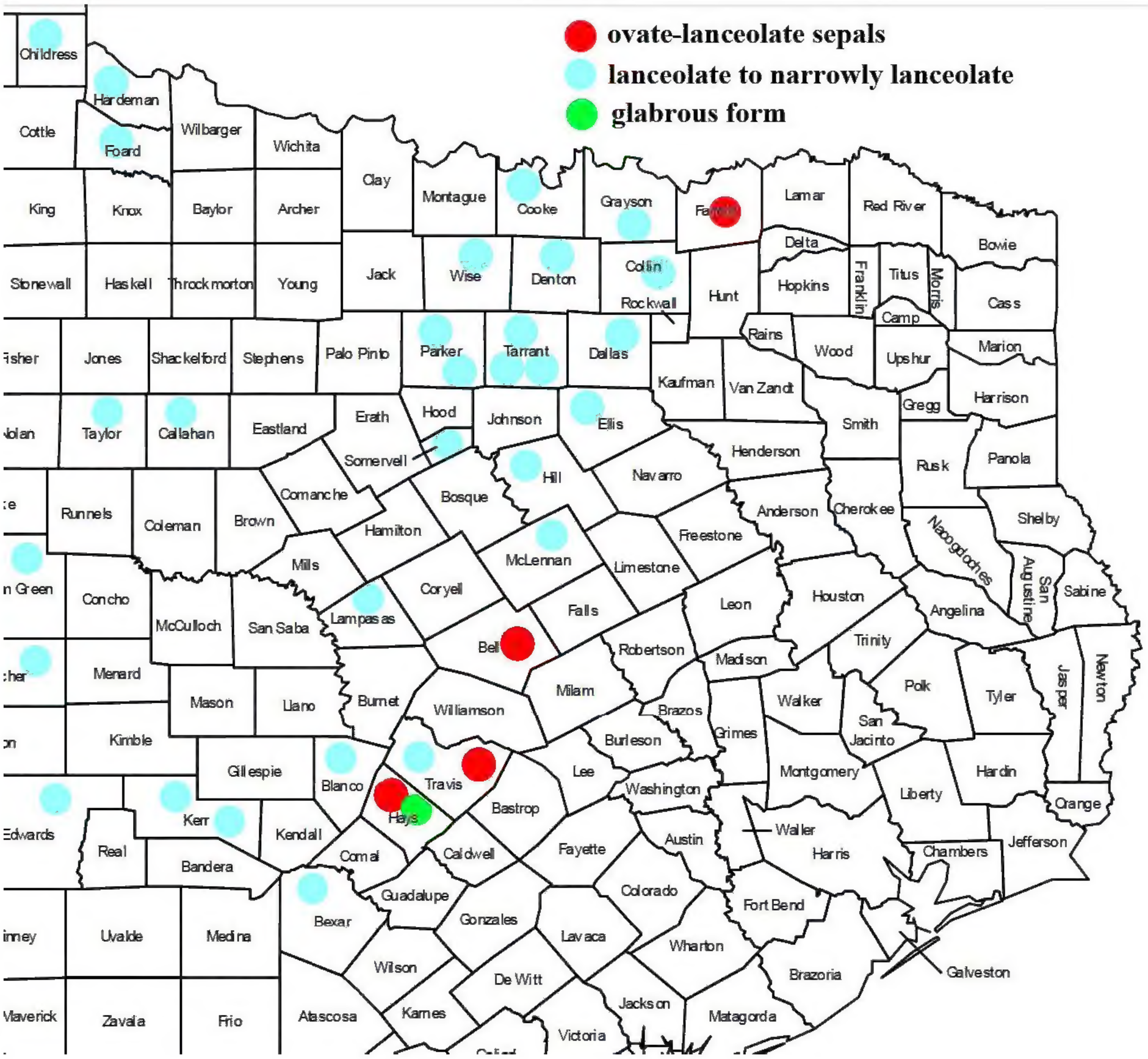
1095 feet elev.

University of Texas - Austin (LL, TEX)
00205095

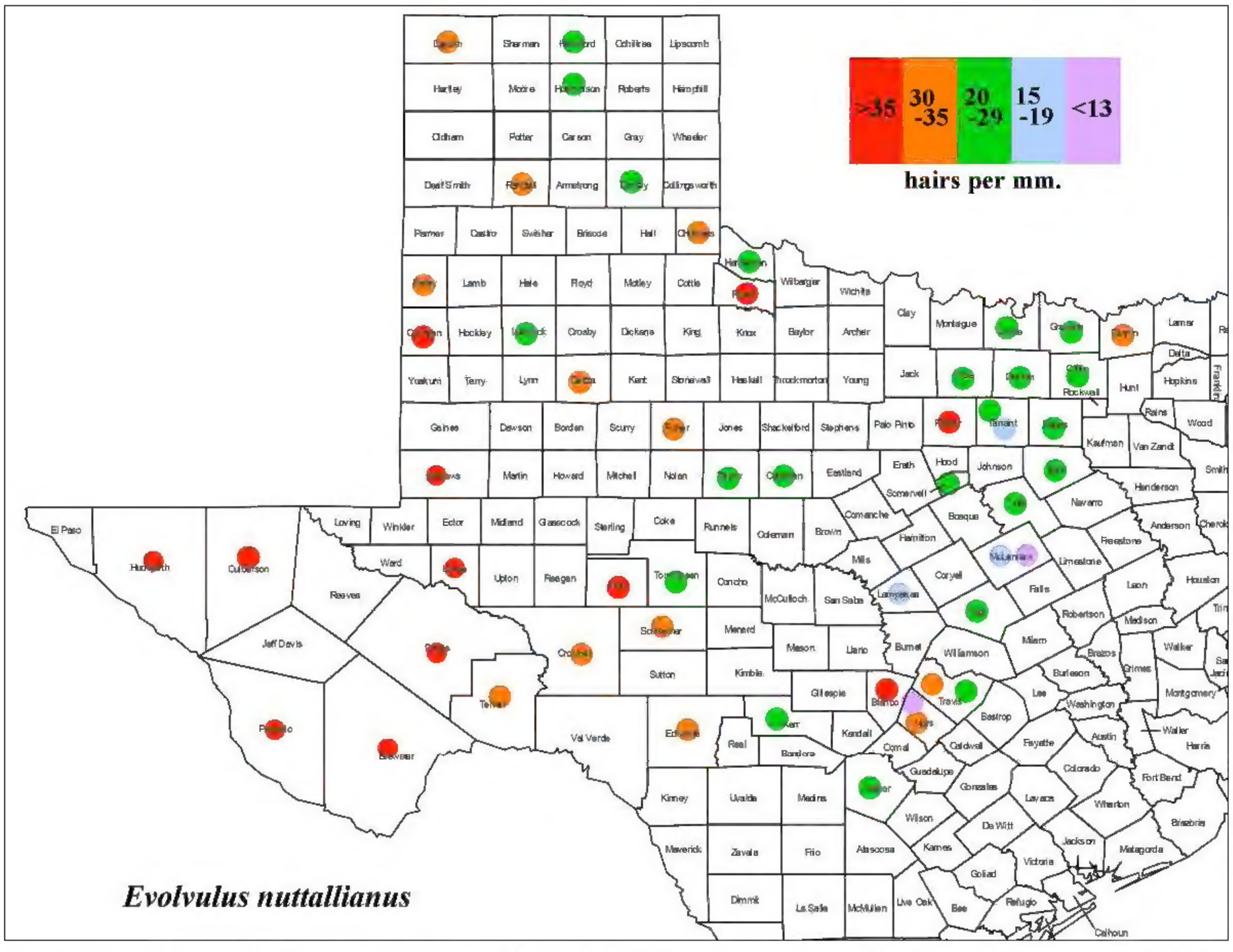
Bob Harms **43** 18 June 2003

The University of Texas Herbarium (TEX)

Figure 11. Pubescent *Evolvulus nuttallianus*, *Harms 43* [TEX], 18 Jun 2003 (cropped for figure display).



Map 1. Distribution of *Evolvulus nuttallianus* sepal types in the eastern half of Texas.



Map 2. Leaf hair density for *Evolvulus nuttallianus* in Texas, based on collections at TEX/LL and SRSC. No collections exist for Jeff Davis and Val Verde Counties.